AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

What is claimed is:

1. (Original) A bi-directional, redundant, optical transport system configured to provide a non-blocking, bi-directional, multi-channel, protocol independent optical transport system for the simultaneous transfer of digital, analog, and discrete data between a plurality data terminal equipment, the optical transport system comprising:

a light transmission line for transmitting light bi-directionally;

a plurality of nodes, connected in series by the light transmission line for receiving, extracting and passing signal light, each node comprising:

data terminal equipment for issuing and receiving electrical signals;

an electro-optical interface device, associated the data terminal equipment, for converting electrical signals issued by the associated data terminal to it signal light for insertion onto the light transmission light and for converting signal light, extracted from the light transmission line into electrical signals to be received by the associated data terminal;

a translation logic device connected between the electrical optical interface device and the data terminal equipment, for performing required protocol translation for the data terminal equipment;

an optical interface device, connected to the electro-optical interface device and the light transmission line, for extracting signal light from the light transmission line to

be converted into electrical signals by the electro-optical interface device for receipt by the data terminal equipment, for inserting, onto the light transmission line, signal light received from the electro-optical interface device and for passing signal light bi-directionally on the light transmission line;

a pump source for inserting excitation light onto the light transmission line;

an optical amplifier connector fiber connecting the each of the optical interface devices serially to one another, wherein the optical amplifier connector fiber is doped with a material which is excited by the excitation light and which emits light having a same wavelength as the light signals when radiated with light signals transmitted bi-directionally by the at least one fiber optic line.

2. (Original) An optical transport system according to claim 1, wherein the data terminal equipment comprises one of a computer, video or telephone device, having different protocol requirements.

3. (Original) An optical transport system according to claim 1, wherein the pump source is a pump laser which emits excitation light.

4. (Original) An optical transport system according to claim 3, wherein the excitation light emitted by the pump laser has a wavelength of about 980 nm.

5. (Original) An optical transport system according to claim 4, wherein the signal light has a wavelength of about 1550 nm.

6. (Original) An optical transport system according to claim 5, wherein the connector fiber is doped with erbium.

7. (Original) An optical transport system according to claim 6, wherein the length

of the optical amplifier connector fiber is set as a function of the amount of amplification required.

8. (Original) An optical transport system according to claim 7, wherein the length of the optical amplifier connector fiber is about two meters.

9. (Original) An optical transport system according to claim 1, wherein the optical interface device comprising:

a first optical coupler for receiving signal light to be inserted onto or extracted from the light transmission line; and

a fiber optic-line, optical coupler, coupled to the light transmission line and to the first optical coupler, for passing light on the light transmission line, for receiving light from the first optical coupler to be inserted onto the light transmission line and transmitting said received light in opposite directions on the light transmission line, and for extracting light from opposite directions on the light transmission line and transmitting said extracted light to the first optical coupler.

10. (Original) An optical transport system according to claim 9 wherein the first optical coupler is a four port, bi-directional optical coupler.

11. (Original) An optical transport system according to claim 10, wherein the first optical coupler has:

first and second ports for receiving light to be inserted onto the light transmission line and for transmitting light extracted from the light transmission line, and

third and fourth ports each respectively connected to the fiber optic-line, optical

coupler;

wherein light received by at least one of the first and second ports is split by the first optical coupler and transmitted by both the third and fourth ports to the light transmission line in opposite directions by the fiber optic-line, optical coupler; and

wherein light extracted from the light transmission line by the fiber optic-line, optical coupler and received by at least one of the third and fourth ports is split by the first optical coupler and transmitted by the both the first and second ports.

12. (Original) An optical transport system according to claim 11, wherein the fiber optic-line, optical coupler is a pair of fiber optic-line, optical couplers comprising first and second fiber optic-line, optical couplers, the first fiber optic-line, optical coupler comprising:

a first port for receiving light transmitted in a first direction on the light transmission line and for transmitting light received from either the second fiber optic-line, optical couplers or the first optical coupler to the light transmission line in a second direction opposite to said first direction;

a second port for transmitting light received from the light transmission line in said first direction by the first port to the second fiber optic-line, optical coupler and for receiving light in said second direction from the second fiber optic-line, optical coupler; and

a third port for transmitting light received from the light transmission line by the first port in the first direction to the first optical coupler;

wherein light received by the first port of the first fiber optic-line, optical coupler is split by the first fiber optic-line, optical coupler and transmitted by both the second and third ports; and

the second fiber optic-line, optical coupler comprising:

a fourth port for receiving light transmitted in the second direction on the light transmission line and for transmitting light received from first optic line optical coupler or the first optical coupler to the light transmission line in the first direction;

a fifth port for transmitting light received from the light transmission line in second direction by the fourth port to the first fiber optic-line, optical coupler and for receiving light in the first direction from the first fiber optic-line, optical coupler; and

a sixth port for transmitting light received from the light transmission line in the first direction by the fourth port to the first optical coupler;

wherein light received by the fourth port of the second fiber optic-line, optical coupler is split by the second fiber optic-line, optical coupler and transmitted by both the fifth and sixth ports.

13. (Original) An optical transport system according to claim 1, wherein the light transmission line comprises first and second fiber optic lines.

14. (Original) An optical transport system according to claim 13, wherein the optical interface device comprises:

a first optical coupler for receiving light to be inserted onto or extracted from the first fiber optic line;

a pair of first fiber optic-line, optical couplers, each coupled to the first fiber optic line and to the first optical coupler, for passing light on the first fiber optic line, for receiving light from the first optical coupler to be inserted onto the first fiber optic line and transmitting said received light in opposite directions on the first fiber optic line, and for

extracting light from opposite directions on the first fiber optic line and transmitting said extracted light to the first optical coupler;

a second optical coupler for receiving light to be inserted onto or extracted from the second fiber optic line; and

a pair of second fiber optic-line, optical couplers, each coupled to the second fiber optic line and to the second optical coupler, for passing light on the second fiber optic line, for receiving light from the second optical coupler to be inserted onto the second fiber optic line and transmitting said received light in opposite directions on the second fiber optic line, and for extracting light from opposite directions on the second fiber optic line and transmitting said extracted light to the second optical coupler.

15. (Original) An optical transport system according to claim 14, wherein the first and second optical couplers are each a four port, bidirectional optical coupler.

16. (Original) An optical transport system according to claim 15, wherein the first optical coupler has:

first and second ports for receiving light to be inserted onto the first fiber optic line and for transmitting light extracted from the first fiber optic line, and

third and fourth ports each respectively connected to one of the pair of first fiber optic-line, optical couplers;

wherein light received by at least one of the first and second ports is split by the first optical coupler and transmitted by both the third and fourth ports in opposite directions on the first fiber optic line by the pair of first optic line optical couplers; and

wherein light extracted from the first fiber optic line and received by at least one of

the third and fourth ports is split by the first optical coupler and transmitted by the both the first and second ports; and

wherein the second optical coupler has:

first and second ports for receiving light to be inserted onto the second fiber optic line and for transmitting light extracted from the second fiber optic line, and

third and fourth ports each respectively connected to one of the pair of second fiber optic-line, optical couplers;

wherein light received by at least one of the first and second ports is split by the second optical coupler and transmitted by both the third and fourth ports to the second fiber optic line in opposite directions by the pair of second fiber optic-line, couplers; and

wherein light extracted from the second fiber optic line and received by at least one of the third and fourth ports is split by the second optical coupler and transmitted by the both the first and second ports.

17. (Original) An optical transport system according to claim 16, wherein the pair of first fiber optic-line, optical couplers comprise first and second fiber optic-line, optical couplers, the first fiber optic-line, optical coupler comprising:

a first port for receiving light transmitted in a first direction on the first fiber optic line and for transmitting light received from either the second fiber optic-line, optical coupler or the first optical coupler to the first fiber optic line in a second direction opposite to said first direction;

a second port for transmitting light received from the first fiber optic line in said first direction by the first port to the second fiber optic-line, optical coupler and for receiving light

in said second direction from the second fiber optic-line, optical coupler; and

a third port for transmitting light received from the first fiber optic line by the first port in the first direction to the first optical coupler;

wherein light received by the first port of the first fiber optic-line, optical coupler is split by the first fiber optic-line, optical coupler and transmitted by both the second and third ports; and

the second fiber optic-line, optical coupler comprising:

a fourth port for receiving light transmitted in the second direction on the first fiber optic line and for transmitting light received from first optic line optical coupler or the first optical coupler to the first fiber optic line in the first direction;

a fifth port for transmitting light received from the first fiber optic line in second direction by the fourth port to the first fiber optic-line, optical coupler and for receiving light in the first direction from the first fiber optic-line, optical coupler; and

a sixth port for transmitting light received from the first fiber optic line in the first direction by the fourth port to the first optical coupler;

wherein light received by the fourth port of the second fiber optic-line, optical coupler is split by the second fiber optic-line, optical coupler and transmitted by both the fifth and sixth ports; and

wherein the pair of second fiber optic-line, optical couplers comprise third and fourth fiber optic-line, optical couplers, the third fiber optic-line, optical coupler comprising:

a first port for receiving light transmitted in a first direction on the second fiber optic line and for transmitting light received from either the fourth fiber optic-line, optical coupler

or the second optical coupler to the second fiber optic line in a second direction opposite to said first direction;

a second port for transmitting light received from the second fiber optic line in said first direction by the first port to the fourth fiber optic-line, optical coupler and for receiving light in said second direction from the fourth fiber optic-line, optical coupler; and

a third port for transmitting light received from the second fiber optic line by the first port in the first direction to the second optical coupler;

wherein light received by the first port of the third fiber optic-line, optical coupler is split by the third fiber optic-line, optical coupler and transmitted by both the second and third ports; and

the fourth fiber optic-line, optical coupler comprising:

a fourth port for receiving light transmitted in the second direction on the second fiber optic line and for transmitting light received from third optic line optical coupler or the second optical coupler to the second fiber optic line in the first direction;

a fifth port for transmitting light received by the fourth port from the second fiber optic line in second direction to the third fiber optic-line, optical coupler and for receiving light in the first direction from the third fiber optic-line, optical coupler; and

a sixth port for transmitting light received from the second fiber optic line in the first direction by the fourth port to the second optical coupler;

wherein light received by the fourth port of the fourth fiber optic-line, optical coupler is split by the fourth fiber optic-line, optical coupler and transmitted by both the fifth and sixth ports.

18. (Original) An optical transport device according to claim 1, wherein the light transmission line comprises more than two fiber optical lines.

19. (Previously Presented) A bi-directional optical transport system for passing optical signals, comprising:

an optical bus for permitting bi-directional transmission of the optical signals;

an electrical-to-optical converter for converting electrical communication signals received from first terminal equipment into optical communication signals;

a first passive optical interface device coupled to the optical bus for routing the optical communication signals received from the electrical-to-optical converter onto the optical bus in both directions and for permitting the optical signals traveling along the optical bus to pass by in both directions;

a second passive optical interface device coupled to the optical bus for routing the optical communication signals traveling along the bus to an optical-to-electrical converter and for permitting the optical signals traveling along the optical bus to pass by in both directions;

a fiber optical amplifier for performing bi-directional amplification of the optical signals; and

the optical-to-electrical converter for receiving the optical communication signals from the second passive optical interface device and for converting the optical communication signals into the electrical communication signals, the optical-to-electrical converter for providing the electrical communication signals to second terminal equipment.

20. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical bus comprises a fiber optic line.

21. (Currently Amended) The optical transport system as set forth in claim 20, further comprising a second fiber optic line wherein the second fiber optic line is a redundant optical bus.

22. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical bus is a broken ring.

23. (Previously Presented) The optical transport system as set forth in claim 19, further comprising a second optical-to-electrical converter for converting optical signals, received from the first passive optical interface device over the optical bus, into electrical signals.

24. (Previously Presented) The optical transport system as set forth in claim 23, wherein the second optical-to-electrical converter is for providing the electrical signals to the first terminal equipment.

25. (Previously Presented) The optical transport system as set forth in claim 23, wherein the second optical-to-electrical converter is for providing the electrical signals to third terminal equipment.

26. (Previously Presented) The optical transport system as set forth in claim 19, further comprising a second electrical-to-optical converter for converting second electrical communication signals into second optical communication signals and for providing the second optical communication signals to the second passive optical interface device, the second passive optical interface device for routing the second optical communication signals

received from the second electrical to-optical converter onto the optical bus in both directions.

27. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical amplifier comprises a fiber amplifier.

28. (Previously Presented) The optical transport system as set forth in claim 27, wherein the fiber amplifier comprise a rare earth doped fiber amplifier.

29. (Previously Presented) The optical transport system as set forth in claim 27, further comprising a pump source for emitting an excitation light received by the optical amplifier.

30. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical amplifier is located along the optical bus

31. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical amplifier is located between the electrical-to-optical converter and the first passive optical interface device.

32. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical amplifier is located between the second passive optical interface device and the optical-to-electrical converter.

33. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical communication signals and optical signals are wavelength division multiplexed and the second passive optical interface device includes a wavelength division multiplexer.

34. (Previously Presented) The optical transport system as set forth in claim 19, wherein the first and second passive optical interface devices comprise taps for diverting a fraction of the optical signals and optical communication signals to the optical-to-electrical converter.

35. (Previously Presented) The optical transport system as set forth in claim 19, wherein the second passive optical interface device comprises a tunable filter for filtering the optical communication signals from the optical signals on the bus.

36. (Previously Presented) The optical transport system as set forth in claim 19, wherein the second passive optical interface device includes a filter for filtering the optical communication signals from the optical signals on the bus.

37. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical-to-optical converter comprises a directly modulated optical source.

38. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical-to-electrical converter generates the electrical signals in Mil_Std 1553 protocol.

39. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical-to-electrical converter generates the electrical signals in ARINC 429 protocol.

40. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise tri-level electrical signals, the optical signals comprise bi-level optical signals, the electrical-to-optical converter converts the tri-

level electrical signals into bi-level optical signals, and the optical-to-electrical converter converts the bi-level optical signals into the tri-level electrical signals.

41. (Previously Presented) The optical transport system as set forth in claim 19, further comprising the first terminal equipment.

42. (Previously Presented) The optical transport system as set forth in claim 41, wherein the first terminal equipment comprises video equipment and the electrical communication signals comprise video signals.

43. (Previously Presented) The optical transport system as set forth in claim 41, wherein the first terminal equipment comprises a sensor and the electrical communication signals comprise data signals.

44. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise radio frequency signals.

45. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise Ethernet signals.

46. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise digital signals.

47. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise analog signals.

48. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical communication signals comprise discrete signals.

49. (Previously Presented) The optical transport system as set forth in claim 41, wherein the first terminal equipment comprises an input device and the electrical communication signals comprise control signals.

50. (Previously Presented) The optical transport system as set forth in claim 41, wherein the first terminal equipment comprises a workstation.

51. (Previously Presented) The optical transport system as set forth in claim 41, further comprising a translation logic device connected between the first terminal equipment and the first passive optical interface device for performing protocol translation.

52. (Previously Presented) The optical transport system as set forth in claim 19, further comprising the second terminal equipment.

53. (Previously Presented) The optical transport system as set forth in claim 19, wherein the optical bus forms a ring topology.

54. (Previously Presented) The optical transport system as set forth in claim 19, wherein the electrical-to-optical converter comprises a tuneable laser.

55. (Previously Presented) A structure equipped with an optical transport system enabling optical communications over an optical bus, comprising:

the structure;

the optical bus for permitting bi-directional transmission of the optical signals, wherein the optical bus is contained at least in part within the structure;

first terminal equipment located within the structure for generating electrical communication signals;

an electrical-to-optical converter located within the structure for converting the electrical communication signals received from the first terminal equipment into optical communication signals;

a first passive optical interface device located within the structure and coupled to the optical bus for routing the optical communication signals received from the electrical-to-optical converter onto the optical bus in both directions and for permitting the optical signals traveling along the optical bus to pass by in both directions;

a fiber optical amplifier located within the structure for performing bi-directional amplification of the optical signals;

a second passive optical interface device located within the structure and coupled to the optical bus for routing the optical communication signals traveling along the bus to an optical-to-electrical converter and for permitting the optical signals traveling along the optical bus to pass by in both directions;

the optical-to-electrical converter for receiving the optical communication signals from the second passive optical interface device and for converting the optical communication signals into the electrical communication signals; and

second terminal equipment located within the structure for receiving electrical communication signals from the optical-to-electrical converter.

56. (Previously Presented) The structure as set forth in claim 55, wherein the structure comprises a vehicle.

57. (Previously Presented) The structure as set forth in claim 55, wherein the structure comprises avionics.

58. (Currently Amended) A method for transporting optical signals over an optical bus between first and second nodes, comprising:

generating electrical communication signals at first node;

converting the electrical communication signals into optical communication signals;

passively splitting the optical communication signals into two components;

routing the two components of the optical communication signals at a first location along the optical bus and permitting the optical signals already on the optical bus traveling in both directions to be passively routed past the first location, the routing involving directing the two components of the optical communication signals in opposite directions along the optical bus and combining the two components with any optical signals already on the optical bus;

at a second location along the optical bus, passively diverting at least some of the optical signals on the bus traveling in both directions toward a second node, wherein the diverting includes permitting the optical signals traveling in both directions to be passively routed past the second location;

converting the optical signals diverted toward the second node into corresponding electrical signals, with the electrical signals including the electrical communication signals generated at the first node;

sending the corresponding electrical communication signals to a translation logic device for performing protocol translation; and

amplifying the optical signals traveling in both directions between the first node and the second node, wherein the amplifying is performed passively and is for compensating for

at least some of the losses associated with diverting the optical signals toward the second node and for losses associated the optical bus.

59. (Previously Presented) The method as set forth in claim 58, further comprising:

generating second electrical communication signals at the second node;

converting the second electrical communication signals into second optical communication signals;

passively splitting the second optical communication signals into two components of the second optical communication signals;

routing the two components of the second optical communication signals at the second location along the optical bus and permitting the optical signals already on the optical bus traveling in both directions to be passively routed pass the second location, the routing involving directing the two components of the second optical communication signals in opposite directions along the optical bus and combining the two components of the second optical communication signals with any optical signals already on the optical bus; and

at a third location along the optical bus, passively diverting at least some of the optical signals on the bus traveling in both directions toward a third node, wherein the diverting includes permitting the optical signals traveling in both directions to be passively routed past the third location.

60. (Previously Presented) The method as set forth in claim 59, wherein generating the second electrical communication signals at the second node and converting

the optical signals diverted toward the second node into corresponding electrical signals occur simultaneously.

61. (Previously Presented) The method as set forth in claim 58, further comprising sending the corresponding electrical communication signals to terminal equipment.

62. (Currently Amended) The method as set forth in claim 61, wherein sending comprises sending the corresponding electrical communication signals to a plurality of terminal equipment.

63. (Canceled)

64. (Canceled)

65. (Previously Presented) The method as set forth in claim 58, wherein passively diverting at the second location comprises selecting optical signals at a set of wavelengths.

66. (Previously Presented) The method as set forth in claim 58, wherein passively diverting at the second location comprises diverting a fraction of the optical signals at all wavelengths.

67. (Previously Presented) The method as set forth in claim 58, wherein passively diverting at the second location comprises selectively tuning a filter to a desired wavelength to select optical signals at that desired wavelength.

68. (Previously Presented) The method as set forth in claim 58, further comprising providing a back up optical bus.

69. (Currently Amended) A method of transporting optical signals between nodes, comprising:

providing a bi-directional optical bus, the bi-directional optical bus permitting bi-directional communication between any of the nodes;

passively diverting at least part of the optical signals traveling along the bus in both directions toward each node;

converting electrical signals generated at any of the nodes into converted optical signals;

separating the converted optical signals into two components and passively combining the two components of the converted optical signals with the optical signals traveling in both directions along the optical bus, wherein the passively combining involves directing the two components of the converted optical signals in opposite directions along the optical bus;

receiving at each node at least part of the optical signals traveling along the optical bus;

at the nodes, converting the received optical signals back into corresponding the electrical signals;

operating at least some of the nodes in full duplex such that each node can simultaneously transmit optical signals and receive optical signals from another node; and

providing passive amplification of the optical signals traveling along the optical bus, the passive amplification being bi-directional and compensating at least for some of the losses associated with passively diverting the optical signals to each node and for losses associated with the optical bus;

wherein by passively diverting optical signals from the optical bus to each node and by passively combining the two components of converted optical signals from each node onto the optical bus, each node can transmit optical signals to any other node and also receive optical signals from any other node.

70. (Canceled)

71. (Previously Presented) The method as set forth in claim 69, wherein receiving at each node at least part of the optical signals traveling along the optical bus comprises selecting optical signals having only certain wavelengths.

72. (Previously Presented) The method as set forth in claim 69, wherein receiving at each node at least part of the optical signals traveling along the optical bus comprises filtering out a group of the optical signals.

73. (Previously Presented) The method as set forth in claim 69, wherein receiving at each node at least part of the optical signals traveling along the optical bus comprises wavelength division multiplexing the optical signals on the bus.

74. (Previously Presented) The method as set forth in claim 69, further comprising providing a back up bi-directional optical bus.

75. (Previously Presented) An optical transport system enabling optical communications between terminal equipment, comprising:

an optical bus for permitting bi-directional transmission of the optical signals;

first terminal equipment for generating electrical communication signals;

an electrical-to-optical converter for converting the electrical communication signals received from the first terminal equipment into optical communication signals;

a first passive optical interface device coupled to the optical bus at a first location for routing the optical communication signals received from the electrical-to-optical converter onto the optical bus in both directions and for permitting the optical signals traveling along the optical bus to pass by in both directions;

a second passive optical interface device coupled to the optical bus at a second location for routing the optical communication signals traveling along the bus to at least one optical-to-electrical converter and for permitting the optical signals traveling along the optical bus to pass by in both directions;

at least one optical-to-electrical converter for receiving the optical communication signals from the second passive optical interface device and for converting the optical communication signals into the electrical communication signals;

a plurality of terminal equipment for receiving the electrical communication signals from the at least one optical-to-electrical converter; and

a fiber optical amplifier for performing bi-directional amplification of the optical signals;

wherein electrical communication signals from first terminal equipment is transmitted over the bi-directional optical bus and can be received by at least one of the plurality of terminal equipment.

76. (Previously Presented) The optical transport system as set forth in claim 75, wherein the system includes a plurality of optical-to-electrical converters, each receiving the optical communication signals from the second passive optical interface device.

77. (Previously Presented) The optical transport system as set forth in claim 76,

wherein the plurality of terminal equipment receive the electrical communication signals from a respective one of the plurality of optical-to-electrical converters.

78. (Previously Presented) The optical transport system as set forth in claim 75, wherein the plurality of terminal equipment receive the electrical communication signals from the one optical-to-electrical converter.

79. (Previously Presented) An optical system for communicating with at least one other system over a bi-directional optical bus, comprising:

an optical transmitter for receiving a first set of electrical signals and for producing a first set of optical signals;

a passive optical interface device for being coupled to the optical bus for routing the first set of optical signals received from the optical transmitter onto the optical bus in both directions and for permitting optical signals already traveling along the optical bus to pass by in both directions;

an optical receiver for receiving a second set of optical signals traveling along the optical bus from the passive optical interface device and for generating a second set of electrical signals; and

a fiber optical amplifier for performing bi-directional amplification of at least one of the first set and second set of optical signals;

wherein the optical amplifier is for compensating for at least some of the coupling losses associated with the passive optical interface device.

80. (Previously Presented) The optical communication system as set forth in claim 79, wherein the optical amplifier is placed between the optical transmitter and the passive

optical interface device and compensates for coupling losses associated with routing the first set of optical signals in both directions along the optical bus.

81. (Previously Presented) The optical communication system as set forth in claim 79, wherein the optical amplifier is placed between the optical receiver and the passive optical interface device and amplifies the second set of optical signals.

82. (Previously Presented) The optical communication system as set forth in claim 79, wherein the optical amplifier is placed on the optical bus and is for amplifying the optical signals traveling along the optical bus.

83. (Previously Presented) The optical communication system as set forth in claim 79, wherein the passive optical interface device isolates the optical receiver from the optical transmitter such that the optical transmitter and optical receiver can operate in full duplex mode.

84. (Previously Presented) A structure equipped with an optical system for communicating with at least one other system over a bi-directional optical bus, comprising:

the structure;

an optical transmitter contained within the structure for receiving a first set of electrical signals and for producing a first set of optical signals;

a passive optical interface device contained within the structure for being coupled to the optical bus for routing the first set of optical signals received from the optical transmitter onto the optical bus in both directions and for permitting optical signals already traveling along the optical bus to pass by in both directions;

an optical receiver contained within the structure for receiving a second set of optical

signals traveling along the optical bus from the passive optical interface device and for generating a second set of electrical signals; and

an optical amplifier contained within the structure for performing bi-directional amplification of at least one of the first set and second set of optical signals;

wherein the optical amplifier is for compensating for at least some of the coupling losses associated with the passive optical interface device and for losses associated with the bi-directional optical bus.

85. (Previously Presented) A method for communicating at a first node with a second node over a bi-directional optical bus, comprising:

generating a first set of electrical signals at the first node;

converting the first set of electrical signals into a first set of optical signals;

passively splitting the first set of optical communication signals into two components;

routing the two components of the first set of optical signals along the optical bus and permitting the optical signals already on the optical bus traveling in both directions to be passively routed pass the first node, the routing involving directing the two components of the first set of optical signals in opposite directions along the optical bus and combining the two components with any optical signals already on the optical bus;

passively diverting toward the first node, a second set of optical signals which are generated by the second node and which are on the bus traveling in both directions, wherein the diverting includes permitting at least some of the optical signals traveling in both directions to be passively routed past the first node;

converting the second set of optical signals into a second set of electrical signals; and

amplifying the optical signals traveling in both directions between the first node and the second node, wherein the amplifying is performed passively and is for compensating for at least some of the losses associated with diverting the optical signals toward the first node and for losses associated with routing the optical signals along the optical bus.